



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IFW

re application of

: **MAIL STOP: Appeal Brief- Patents**

Ryo SHINATA

: **Confirmation No. 1083**

Serial No. 10/646,780

: Attorney Docket No. 2003_1198A

Filed August 25, 2003

: Group Art Unit 3683

HYDRAULIC SHOCK ABSORBER

: Examiner C.P. SCHWARTZ

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Commissioner for Patents
P.O. Box 1450
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Respectfully submitted,

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2003_1198A



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of : **MAIL STOP: Appeal Brief-Patents**
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APPELLANT'S BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following is Appellants' Brief, submitted under the provisions of 37 CFR 41.37. Pursuant to the provisions of 37 CFR 41.20, this Brief is submitted with a fee of \$500.00, and this is an appeal from the final rejection of claims 6-11.

1. REAL PARTY IN INTEREST

The real party in interest is Kabushiki Kaisha Hitachi Seisakusho (d/b/a Hitachi, Ltd.). (please note that a merger was filed on March 14, 2005 and has not yet been recorded)

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

3. STATUS OF CLAIMS

Claims 6-11 are finally rejected.

4. STATUS OF AMENDMENTS

An "Amendment After Final" was filed on June 21, 2005; however, this response requested reconsideration and did not amend the claims in any manner.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

A. The invention of claims 6-8

With reference to Figures 1-8 and pages 6-12 of the original specification, the invention of claim 6 is a shock absorber comprising:

as shown in Figures 1 and 2, **a cylindrical housing (12)** adapted to be filled with a damping fluid, the cylindrical housing having an interior (page 6, lines 20-22);

as shown in Figures 1 and 2, **a piston (20)** slidably disposed within the cylindrical housing to divide the interior of the cylindrical housing into an upper working chamber (22) and a lower working chamber (24) (page 6, line 28 - page 7, line 5);

as shown in Figure 2, **a passage (76 or 78)** extending between the upper and lower working chambers and adapted to selectively allow the damping fluid to flow therethrough during movement of the piston, the passage having an upstream end and a downstream end (page 9, lines 4-8);

as shown in Figure 2, **a valve seat (74)** (page 8, line 27 - page 9, line 2) located adjacent to the downstream end of the passage; and

as shown in Figure 2, **a valve assembly (80)** operable to selectively open and close the passage during movement of the piston (page 9, line 12 - page 11, line 13), the valve assembly including

(i) as shown in Figures 2 and 3, **a first valve disc (84)** held on and deflectable toward the piston, and separated from the valve seat (page 9, lines 19-26),

(ii) as shown in Figures 2 and 4, **a second valve disc (86)** on the first valve disc and normally seated on the valve seat, the second valve disc **including circular apertures (102)** arranged in a circumferentially spaced relationship and selectively openable and closable by the first valve disc (page 10, lines 6-14),

(iii) as shown in Figures 2 and 5, **a third valve disc (88)** on the second valve disc and **having notches (108)** arranged in a circumferentially spaced relationship, the notches each having

an inner end (112) and an outer end (110) (page 10, line 22 - page 11, line 3), and cooperating with the circular apertures to form ports (118, 120, 122, 124), the ports being constantly communicated with one of the upper and lower working chambers that is located downstream of the valve seat (Figures 2, 7 and 8, and page 12, lines 4-22); and

(iv) as shown in Figures 2 and 6, a **fourth valve disc (90)** cooperating with the second valve disc to sandwich the third valve disc so that restrictive orifices (116) (Figures 7, 7A and 8) are defined at the outer end of each of the notches (page 11, lines 10-13 and lines 24-27),

wherein the ports each have a cross sectional area greater than a cross sectional area of each of the restrictive orifices, regardless of a relative angular position between the second and third valve discs (Figures 7 and 8, page 12, lines 4-24).

With regard to the invention as recited in claim 7, the apertures are equally spaced from one another, and the notches are equally spaced from one another, with the apertures all being communicated with the notches regardless of a relative angular position between the second and third valve discs. This is shown in Figures 7 and 8.

With regard to the invention as recited in claim 8, as shown in Figure 11 and described on page 19, lines 6-16 of the original specification, the circular apertures include **first circular apertures (152)** arranged in a circumferentially equally spaced relationship and **second circular apertures (154)** arranged in a circumferentially equally spaced relationship, with the second circular apertures being located radially outwardly from the first circular apertures, and with the second circular apertures being angularly displaced from the first circular apertures so that each one of the second circular apertures is positioned between adjacent ones of the first circular apertures.

B. The invention of claims 9-11

With reference to Figures 1-8 and pages 6-12 of the original specification, the invention of claim 9 is a piston assembly for a shock absorber including a cylindrical pressure tube (12) filled with a damping fluid (page 6, lines 20-22), which piston assembly comprises:

as shown in Figures 1 and 2, **an annular piston element (20)** (page 6, line 28 - page 27, line 2) adapted to be slidably disposed within the pressure tube and connected to a piston rod (32) page

7, lines 12-13), the piston element including an upper valve seat (68) (page 8, lines 21-25) and a lower valve seat (74) (page 8, line 27 - page 9, line 2);

as shown in Figures 2 and 3, **a first annular valve disc (84)** being deflectable toward and positioned against one side of the annular piston element, and having an outer peripheral edge spaced from the lower valve seat (page 9, lines 19-26);

as shown in Figures 2 and 4, **a second annular valve disc (86)** retained on the first annular valve disc and having an outer peripheral edge to be selectively seated on and unseated from the lower valve seat, the second annular valve disc **including circular apertures (102)** arranged in a circumferentially spaced relationship (page 10, lines 6-14);

as shown in Figures 2 and 5, **a third annular valve disc (88)** retained on the second annular valve disc and **having notches (108)** arranged in a circumferentially spaced relationship, the notches each having an inner end (112) and an outer end (110) (page 10, line 22 - page 11, line 3) and cooperating with the circular apertures to form ports (118, 120, 122, 124) (page 12, lines 4-22); and

as shown in Figures 2 and 6, **a fourth valve disc (90)** cooperating with the second annular valve disc to sandwich the third annular valve disc so that restrictive orifices (116) (Figures 7, 7A and 8) are defined at the outer end of each of the notches (page 11, lines 10-13 and lines 24-27), the ports each having a cross sectional area greater than a cross sectional of each of the restrictive orifices regardless of a relative angular position between the second and third annular valve discs (Figures 7 and 8, page 12, lines 4-24).

With regard to the invention as recited in claim 10, the apertures are equally spaced from one another, and the notches are equally spaced from one another, with the apertures all being communicated with the notches regardless of a relative angular position between the second and third valve discs. This is shown in Figures 7 and 8.

With regard to the invention as recited in claim 11, as shown in Figure 11 and described on page 19, lines 6-16 of the original specification, the circular apertures include **first circular apertures (152)** arranged in a circumferentially equally spaced relationship and **second circular apertures (154)** arranged in a circumferentially equally spaced relationship, with the second circular apertures being located radially outwardly from the first circular apertures, and with the second circular

apertures being angularly displaced from the first circular apertures so that each one of the second circular apertures is positioned between adjacent ones of the first circular apertures.

The invention as recited in claims 6 and 9 is an improvement over the prior art because of the second valve disc (86) having circular apertures (102) as opposed to having a C-shaped aperture as shown in Figure 15. In this regard, as explained on page 2 of the original specification, when a second valve disc having a C-shaped aperture is utilized, the first valve disc may be deflected into the C-shaped aperture under pressure exerted by a compression movement of the piston. Over time and continued use, the repeating of such deflection can cause the first valve disc to deform permanently or fail due to fatigue. The second valve disc (86) having circular apertures (102) addresses this problem by limiting the extent to which the first valve disc deflects under pressure exerted by a compression movement of the piston.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 6-11 are unpatentable under 35 U.S.C. § 103(a) over Miura in view of Yamaoka or Yamaura et al.

7. ARGUMENT

In determining the difference between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences *themselves* would have been obvious, but whether the claimed invention *as a whole* would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983).

As alluded to previously, a purpose of the instant invention is to prevent excessive deformation of a first valve disc under pressure exerted by compression movement of a piston. Specifically, as described in the complete paragraph on page 2 of the original specification, if a second valve disc having a C-shaped aperture is utilized, under a build-up of back pressure above the piston, a portion of the first valve disc is caused to flex into the C-shaped aperture. Such repeated flexing, due to fluid flow during compression and rebound movement of the piston, may result in the first valve disc being plastically deformed or failing because of fatigue. With this problem in mind,

Appellant arrived at the instant invention. Specifically, in order to solve such a problem, a valve disc having circular apertures, instead of the C-shaped aperture, is employed. Use of a valve disc having circular apertures prevents the first valve disc from excessive deflection due to the aforementioned back pressure.

None of the references relied upon by the Examiner recognize, or are concerned with such a problem, and accordingly, when the invention as a whole is considered along with the following discussion of the rejections issued by the Examiner, it is respectfully submitted that it will have been sufficiently demonstrated that a *prima facie* case of obviousness has not been established.

CLAIM 6

Claim 6 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). This rejection is in error because the Examiner has failed to demonstrate that Yamaoka or Yamamura provide sufficient motivation to modify Miura so as to arrive at the claimed invention. The basic rationale used by the Examiner to support the rejection of claim 6 is set forth in the initial two paragraphs on page 3 of the Final Rejection, and appears to be that because it is well known in the art to tailor a damping force of a shock absorber by varying size, shape and respective orientations of orifices in valve discs of a valve assembly of the shock absorber (as evidenced by Yamaoka and Yamamura), and because Miura suggests that a damping force can be altered by changing a "configuration" of valve discs, one having ordinary skill in that art would have found it obvious to modify Miura to arrive at the arrangement and configuration of the valve discs as recited in claim 6. This rationale is believed to be flawed for the following reasons.

It is not disputed that in column 3, lines 49-51 of Miura it is stated that "the number, the location and the configuration of the cut-outs 25a may be determined as desired". Nor is it disputed that in column 5, lines 23-26 it is stated that "ratio between the damping force in the extension and contraction strokes of the damper particularly in the range of low piston speed can be determined as desired". However, it is respectfully submitted that the Examiner has mis-characterized what is recited in column 1 of Miura.

In this regard, the Examiner states that column 1 expresses that the damping force may be altered by changing the configuration of the valve discs; however, this is not what is represented by column 1. Specifically, this column does not state that the damping force may be altered by changing the “configuration of the valve discs”, but rather this column states that the damping force can be chosen by changing the **thickness and the material of the valve disc** (column 1, lines 28-34). Thus, there is no teaching in Miura of changing locations, sizes and shapes of openings in valve discs so as to obtain desired damping characteristics.

In any event, even if Miura did state that certain parameters could be varied by altering locations, sizes and shapes of openings in valve discs, simply because Yamaoka and Yamaura disclose a valve disc having circular apertures would not be sufficient to demonstrate that one having ordinary skill in the art would have been motivated to combine these references to arrive at a shock absorber having a disc with circular apertures that cooperate with notches in another disc to form ports.

The rejection appears to be based on the premise that since various discs as shown in the three references can possibly be modified in terms of the sizes, locations and shapes of their openings, that one having ordinary skill in the art would have been motivated to combine any such modified discs to attain desired shock absorber characteristics, and ultimately arrive at the instantly claimed invention. However, in order for a *prima facie* case of obviousness to be established, there must be some suggestion or motivation to modify the primary reference or to combine the teachings of the references. That references can be combined or modified does not render a resultant combination obvious unless the prior art teaches the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The Examiner must provide some reasonable explanation as to why the combination of references would result in the invention as claimed, and it is respectfully submitted that the Examiner has failed to do so. For reasons to follow, neither Yamaoka nor Yamamura teaches or suggests to one having ordinary skill in the art that Miura could have been modified to arrive at the specific arrangement and configuration of valve discs as required by claim 6.

Independent claim 6 requires a valve assembly that includes:

a first valve disc;

**a second valve disc on said first valve disc, said second valve disc including circular apertures;
a third valve disc on said second valve disc, said third valve disc having notches cooperating with the circular apertures to form ports; and
a fourth valve disc cooperating with said second valve disc to sandwich said third valve disc.**

Miura discloses a hydraulic damper comprising a cylinder 2 and a piston 6 slidably fitted in the cylinder so as to define two liquid chambers 3 and 4 within the cylinder. Passages 11 and 12 extend through the piston 6. On opposite sides of the piston 2 are disc valves 13 and 14 for controlling flow of liquid to and from chambers 3 and 4 through passages 11 and 12. The disc valve 13 comprises three mutually overlapping annular discs 13a, 13b and 13c, with disc 13c having one or more cut-outs in its outer circumference so as to define a permanent orifice through which chambers 3 and 4 are permanently communicated. The construction or configuration of discs 13a and 13b is not described.

As shown in Figures 3 and 4, the disc valve 14 includes a disc 24 having a C-shaped aperture 24d and a disc 25 having cut-outs 25a. In an alternative embodiment, as shown in Figures 6-11, disc valve 42 is substituted for disc valve 14. The disc valve 42 includes four mutually overlapping annular discs 40, 41, 25 and 26. Disc 40 is an annular solid plate, disc 41 has at least one arcuate opening 41d similar to opening 24d of disc 24, disc 25 has cut-outs 25a in permanent communication with arcuate opening 41d, and disc 26 is shown to be an annular solid disc.

Disc valve 42 is similar to the valve assembly as recited in claim 6 in that the arcuate aperture 41d of second disc 41 is in constant communication with notches or cut-outs 25a of third disc 25. However, **Miura** fails to disclose or suggest that opening 41d is to be anything other than arcuate or C-shaped, and accordingly, **Miura** fails to teach or suggest the "circular apertures" of the second disc as required by each claim 6. As such, the hydraulic damper of **Miura** can be subject to the same problem as is the prior art shock absorber as described on pages 1-2 of the original specification.

The Examiner recognized this deficiency of **Miura**, and thus relied upon either **Yamaoka** or **Yamamura** for a finding that one having ordinary skill in the art would have found it obvious to have the second disc 41 of **Miura** include circular apertures instead of the arcuate or C-shaped opening

thereof. It is not disputed that Yamaoka in Figure 9 shows circular orifices 102b in orifice plate 102, nor that Yamamura in Figure 5 shows circular openings 164 in stopper plate 144; however, these teachings would not have taught, or suggested to, one having ordinary skill in the art that circular apertures could be substituted for the C-shaped aperture 41d in disc 41 of Miura.

Yamaoka in Figures 8-14 discloses an embodiment of a shock absorber comprising cylinder 10 and a piston 12 slidably fitted in the cylinder so as to define two liquid chambers 14 and 16 within the cylinder. Passages 22 extend through the piston 6, and on opposite sides of the piston 12 there are disc valve assemblies 50 and 100 for controlling flow of liquid to and from chambers 14 and 16 through passages 22. The disc valve assembly 50 comprises elastic annular disk plates, the specific construction of which is not described. The disc valve assembly 100 comprises annular disc plates 102, 104, 106 and 108. First constant orifice plate 102 is an outermost plate and includes orifices 102b, first disc plate 104 is adjacent plate 102 and has C-shaped apertures 104b and 104c, second constant orifice plate 106 is adjacent plate 104 and has openings 106b and cut-outs 106c, and second disc plate 108 is adjacent plate 106. Orifices 102b are in communication with C-shaped apertures 104b, openings 106b are in communication with C-shaped apertures 104b and 104c, and cut-outs 106c are in communication with C-shaped aperture 104c. None of the other embodiments of Yamaoka not include any valve disc having circular apertures.

Were the valve assembly of Figures 8-14 of Yamaoka corresponded to the claimed invention, plate 102 would correspond to the first valve disc, plate 104 would correspond to the second valve disc, plate 106 would correspond to the third valve disc, and plate 108 would correspond to the fourth valve disc. Accordingly, were the disc 41 of Miura to have been modified in view of Yamaoka, the teachings of Yamaoka as they pertain to plate 104 would have been employed. However, as with the prior art shock absorber and the hydraulic damper of Miura, plate 104 of Yamaoka includes a C-shaped aperture and not circular apertures, and accordingly, one would not have learned that disc 41 of Miura could include apertures other than arcuate or C-shaped apertures.

Additionally, because of plate 102's position relative to the other plates (i.e. being an outermost plate), and because of the relationship between orifices 102b and cut-outs 106c (the orifices do not communicate with the cut-outs), one having ordinary skill in the art would have

gleaned nothing from the configuration of plate 102 with regard to how disc 41 of Miura could have been modified.

Thus, a combination of Miura and Yamaoka would not have resulted in the specific arrangement and configuration of valve discs as recited in claim 6, whereby a combination of these references does not support a prima facie case of obviousness of claim 6.

Yamamura in Figures 1 and 2 discloses an embodiment of a shock absorber including a piston assembly 100 disposed within a cylinder 10 and dividing the cylinder into upper and lower chambers 12 and 14. The piston assembly includes a piston body 102 having fluid flow orifices 116 for communicating the chambers 12 and 14 with one another. A check valve member 124 is positioned at a top of the orifices 116, and a piston stroke speed development variable damping characteristics valve unit 136 is provided at the bottom of the orifices 116. The valve unit 136 comprises an upper disc valve member 138 and a lower disc valve member 140, with an annular washer 142 and a stopper plate 144 disposed between the upper and lower disc valve members 138 and 140. The lower disc valve member 140 is not disclosed to have notches or cut-outs, and Figures 3-6 show alternative configurations of the stopper plate 144. Accordingly, even when the stopper plate of Figure 5 is employed, the circular openings 164 would not communicate with notches or cut-outs in an adjacent disc or plate to form ports.

Thus, because there is no teaching of using the stopper plate of Figure 5 with a valve disc or plate including notches or other openings, one having ordinary skill in the art would not have been motivated to use this stopper plate, or incorporate teachings thereof, in the disc valve 14 of Miura which includes plural discs each having openings or orifices through which fluid is to flow. Accordingly, a combination of Miura and Yamamura would not have resulted in the specific arrangement and configuration of valve discs as recited in claim 6, whereby a combination of these references does not support a prima facie case of obviousness of claim 6.

CLAIM 9

Claim 9 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). The above reasons

explaining why the rejection of claim 6 is in error are hereby repeated to demonstrate that a prima facie case of obviousness has not been established for claim 9.

CLAIM 7

Claim 7 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). The above reasons explaining why the rejection of claim 6 is in error are hereby repeated to demonstrate that a prima facie case of obviousness has not been established for claim 7. Additionally, claim 7 requires that the circular apertures are all communicated with the notches regardless of a relative angular position between the second and third discs. As explained above, because there is no motivation to combine the references to arrive at a combination in which circular apertures of one disc are in communication with notches of an adjacent disc, there can be no motivation to combine the references to arrive at a combination in which the circular apertures and notches are related to each other as required by claim 7. Thus, a prima facie case of obviousness has not been established for claim 7.

CLAIM 10

Claim 10 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). The above reasons explaining why the rejection of claim 7 is in error are hereby repeated to demonstrate that a prima facie case of obviousness has not been established for claim 10.

CLAIM 8

Claim 8 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). The above reasons explaining why the rejection of claim 6 is in error are hereby repeated to demonstrate that a prima facie case of obviousness has not been established for claim 8. Additionally, claim 8 requires a specific arrangement of the circular apertures which is not shown in any of the references. For this additional reason, a prima facie case of obviousness has not been established for claim 8.

CLAIM 11

Claim 11 stands finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Miura in view of Yamaoka '113 (Yamaoka) or Yamamura et al. (Yamamura). The above reasons explaining why the rejection of claim 8 is in error are hereby repeated to demonstrate that a prima facie case of obviousness has not been established for claim 11.

8. APPENDIX

A copy of the claims on appeal is set forth in an Appendix immediately following the conclusion and signature, and is incorporated herein by reference.

CONCLUSION

For the reasons set forth above, it is submitted that a prima facie case of obviousness has not been established for any of claims 6-11, whereby the Examiner's decision to finally reject these claims should be reversed.

Respectfully submitted,

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APPENDIX - Claims on Appeal.

6. A shock absorber comprising:

a cylindrical housing adapted to be filled with a damping fluid, said cylindrical housing having an interior;

a piston slidably disposed within said cylindrical housing to divide the interior of said cylindrical housing into an upper working chamber and a lower working chamber;

a passage extending between said upper and lower working chambers and adapted to selectively allow the damping fluid to flow therethrough during movement of said piston, said passage having an upstream end and a downstream end;

a valve seat located adjacent to said downstream end of said passage; and

a valve assembly operable to selectively open and close said passage during movement of said piston, said valve assembly including

(i) a first valve disc held on and deflectable toward said piston, and separated from said valve seat,

(ii) a second valve disc on said first valve disc and normally seated on said valve seat, said second valve disc including circular apertures arranged in a circumferentially spaced relationship and selectively openable and closable by said first valve disc,

(iii) a third valve disc on said second valve disc and having notches arranged in a circumferentially spaced relationship, said notches each having an inner end and an outer end and cooperating with said circular apertures to form ports, said ports being constantly communicated with one of said upper and lower working chambers that is located downstream of said valve seat; and

(iv) a fourth valve disc cooperating with said second valve disc to sandwich said third valve disc so that restrictive orifices are defined at the outer end of each of said notches,

wherein said ports each have a cross sectional area greater than a cross sectional area of each of said restrictive orifices, regardless of a relative angular position between said second and third valve discs.

7. The shock absorber according to claim 6, wherein said apertures are equally spaced from one another, and said notches are equally spaced from one another, with said apertures all being communicated with said notches regardless of a relative angular position between said second and third valve discs.

8. The shock absorber according to claim 6, wherein said circular apertures include first circular apertures arranged in a circumferentially equally spaced relationship and second circular apertures arranged in a circumferentially equally spaced relationship, with said second circular apertures being located radially outwardly from said first circular apertures, and with said second circular apertures being angularly displaced from said first circular apertures so that each one of said second circular apertures is positioned between adjacent ones of said first circular apertures.

9. A piston assembly for a shock absorber, the shock absorber including a cylindrical pressure tube filled with a damping fluid, said piston assembly comprising:

- an annular piston element adapted to be slidably disposed within the pressure tube and connected to a piston rod, said piston element including an upper valve seat and a lower valve seat;

- a first annular valve disc being deflectable toward and positioned against one side of said annular piston element, and having an outer peripheral edge spaced from said lower valve seat;

- a second annular valve disc retained on said first annular valve disc and having an outer peripheral edge to be selectively seated on and unseated from said lower valve seat, said second annular valve disc including circular apertures arranged in a circumferentially spaced relationship;

- a third annular valve disc retained on said second annular valve disc and having notches arranged in a circumferentially spaced relationship, said notches each having an inner end and an outer end and cooperating with said circular apertures to form ports; and

- a fourth valve disc cooperating with said second annular valve disc to sandwich said third annular valve disc so that restrictive orifices are defined at the outer end of each of said notches, said ports each having a cross sectional area greater than a cross sectional of each of said restrictive orifices regardless of a relative angular position between said second and third annular valve discs.

10. The piston assembly according to claim 9, wherein said apertures are equally spaced from one another, and said notches are equally spaced from one another, with said apertures all being communicated with said respective notches regardless of a relative angular position between said second and third annular valve discs.

11. The piston assembly according to claim 9, wherein said circular apertures include first circular apertures arranged in a circumferentially equally spaced relationship and second circular apertures arranged in a circumferentially equally spaced relationship, with said second circular apertures being located radially outwardly from said first circular apertures, and with said second circular apertures being angularly displaced from said first circular apertures so that each one of said second circular apertures is positioned between adjacent ones of said first circular apertures.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None